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ORIGINAL ARTICLES.

CASTRATION OF THE COW.

PAPER READ BEFORE THE NEW YORK STATE VETERINARY SOCIETY.

BY HUBERT T. FOOTE, D.V.S.

The technical term applied to castration of the female is ovariotomy. Among the laity it is known as spaying. The definition of these terms is the extirpation of the essential organs of generation, which are the ovaries. Before presenting my experiences in this operation during the past summer, I will give a cursory review of the history of ovariotomy from the time of its origin, for which I have referred largely to J. Gourdon's most excellent "Treatise on the Castration of the Domestic Animals." The place and epoch of the origin of the operation is unknown. It is mentioned in the Jewish book, Talmud, prescribing the castration of the female in general, but, according to Aristotle, Pliny, Galien and Elien, the camel and sow were the only animals in which it was allowed.

The first reliable documents which we possess on this subject are by Oliver de Serres, showing that the operation dates back to at least the 16th century, when it was practiced for the purpose of fattening the animals and improving their meat. It has been practiced to some extent in all of the European countries since, but very little, until Thomas Winn, of Natchez, Miss., in the year 1831, discovered its utility in increasing the flow and quality of the milk by operating on the cow about one month after calving. He died without making his discovery publicly known, but having described it to a traveler, his results were carried to Europe, where Mons. Levrat was the first to experiment in the operation. Many other Europeans soon followed him in this practice. Noticeable among them was Mons. Charlier, who devoted his life to its further development, and is credited with being the first to perform ovariotomy by the vaginal method. As to the different modes that have been employed in performing this operation, they have been varied in one respect, that is, in the manner of removing the ovaries. Only two methods have been employed for entering the abdominal cavity, one being through the flank, while the other is through the vaginal walls. Levrat, who was the first to give his experience on the castration of cows, operated through the left side, without preparing the animal save by depriving her of her morning meal. He made his incision through the flank vertically, half way between the external angle of the ilium and the last rib, and removed the ovaries by scraping the vessels, fallopian tubes and ligaments with his thumb nail until those organs were detached, or, as he removed them at a later period, by means of torsion, twisting one at a time, the three small ligaments attaching the ovary to the broad ligament until they broke, when that organ would come away readily.

Among other operators, opinion varied as to the best side in which to make the incision, Charlier favoring the right, in consequence of the danger of injuring the rumen in entering the left flank, or of after-adhesion of that organ to the wound, which would interfere with the free exercise of its functions—inconveniences not to be dreaded on the right side. While Levrat made the incision through both the skin and the abdominal mus-

cular wall at one stroke, and only large enough to admit of the passage of one arm, Charlier recommended the incision of the skin, then, layer by layer, of the abdominal muscles, making the opening large enough for the passage of both of the arms, claiming it as more expeditious, using both hands to extract the ovaries, less fatiguing, safer, and injuring the broad ligament and connections less, while the wound healed as quickly as the shorter one. He tore or twisted the ovaries off after breaking the ovarian ligaments, which is the method still used by the many gelders and spayers that are now traveling over our country. As to the incision, I believe that most of these latter make it on the left side, and large enough to admit one arm. The pain in this mode of operating is very great and acts sensibly upon the organism of the animal, increasing the fever and diminishing, in consequence, the secretion of the milk when it does not result in death. The symptoms following, are like those which will be presently given in describing the vaginal method of operating, but much more aggravated, the animal being sick fully twice as long, with the addition of the symptoms peculiar to the external wound, which are, about the third day, tumefaction, and great tenderness with organization of plastic lymph between its lips.

The accidents following the operation by the incision of the flank are principally: emphysema in the external wound, hemorrhage in this wound, prolonged reactional fever, suppuration of the wound, hemorrhage from the ovarian arteries, peritonitis, return of the rut in the animal.

The emphysema is the most ordinary but least grave of the preceding complications. It appears immediately, or a few hours after operating, in the form of a diffuse tumefaction, variable in extent, sometimes reaching the shoulders and back, and even the opposite side of the body. It is supposed to originate from the expulsion, through the wound, of air which was taken into the abdominal cavity at the time of operating, by the action of the diaphragm. This air spreading in the sub-cutaneous cellular tissue may dissipate itself, or the skin may be punctured and the air pressed out.

The next complication, hemorrhage from the wound in the

flank, comes from the division of the circumflex iliac artery, and sometimes is alarmingly abundant. The suturing of the wound generally stops it, but it is better to ligature or twist the bleeding vessel, as there is danger of the blood running into the peritoneal cavity and causing further complications.

Suppuration of the wound always arises when the healing is not by first intention, and only causes a delay in the healing, except when gangrene sets in, which almost always results in the death of the animal. Another danger from this complication, that may be noted, is the extension of the inflammation, in this case excessive, to the internal organs.

The last three accidents following the operation, I will leave until I take up the operation per vagina, as they are common to that method also.

And now, says Mons. Gourdon in his work on this subject, to these divers complications must be added the necessity of binding the cow by means which torment, irritate and wound her;

The difficulty of the operation, in which one tears with the fingers the ligaments which hold the ovary, exposing the operation to failure from practicing it in an incomplete manner;

The acute pain from cutting the skin and muscles, a pain causing bellowing and struggling, and which aggravates the general condition of the animal, increasing the extent of the reactional fever, &c.;

The fever of reaction itself, extending sometimes with irritable subjects so such a high degree that it is accompanied with nervous symptoms, constipation, diminution of the secretion of the milk, and reacting always in an unfavorable manner after the operation;

The *extent*, the *difficulty of healing*, of this wound in the middle of the flank, through muscular folds, aponeurosis, cellular and serous tissues crossing one another diversely, and which may be injured with the arm in seeking the ovaries;

Finally, the *mortality* in consequence of the action of these divers causes, which cannot be estimated at less than from 15 to 18 per cent. of the total subjects operated upon, itself explains why the method by the incision of the flank, after numerous more or less unsatisfactory attempts, has been completely abandoned.

Next, we will consider the operation per the vaginal incision. This method was first practised in 1850, the priority being claimed by two veterinarians, Mons. Pranger and Charlier; and while it has never been satisfactorily proven to which the discovery of the operation does belong, it has generally been conceded to the latter, as he was the first to explain the method of operating, which he did July 29, 1850, before the Academy of Sciences. His method at that time was as follows: After securing the cow in a standing position, he thrust his left hand into the vagina; then, stretching the superior wall of that organ, he inserted his right hand, in which he held a concealed knife having a short blade with a concave edge. With this instrument he made an incision through the superior walk in the median line, commencing about two inches above and behind the os uteri, and extending it for about three inches backwards. Through this incision he passed the thumb, index and median fingers, with which he grasped one of the ovaries, drawing it into the vagina, where, with torsion instruments, he twisted it from the broad ligament, and then treated the other ovary in a like manner. Several improvements were made from time to time, Charlier himself experimenting considerably with different instruments for dilating the vagina, and finally adopting—instead of the fixed pincers for holding the broad ligament firmly, while the torsion pincers twisted the ovary off—a thimble to be placed on the thumb of the left hand, and to answer the same purpose. This caused less injury to the broad ligament by his being able to regulate the stretching of that delicate membrane, besides avoiding the danger of fatal hemorrhage from the ovary breaking away on the third or fourth turn, and the ligament then untwisting itself, as sometimes happened. Later, Charlier substituted the ecraseur for the pincers, which is the instrument now used for extracting the ovaries. He perfected the operation by this method to the extent of reducing the mortality following to not more than one per cent. The operation of Mon. Colin, another experimenter, was essentially the same as Charlier's, that is, by torsion; but he contrived simpler and cheaper forms of instruments for that purpose. Pranger's operation differed from that of the others only in the ligaturing of the ovarian

arteries. But this method, while being a sure preventive from hemorrhage, produces a much greater liability to peritonitis from the irritation caused by the threads which are brought out through the vaginal opening.

By the numerous experiments with ovariotomy in France, and close observation following the operation, it has been proved to be useful in curing nymphomania, in sterilizing cows that give only an inferior quality of offspring, as well as those that are predisposed to abortion or difficult parturition, and placing those as well as the unfruitful and old cows, that are no longer desirable for reproduction, in a condition for fattening, at the same time bettering the quality of their meat. Charlier claims that after spaying a cow gives double the quantity of milk; but for this he only encourages it as a special industry, as in the dairies. The operation can be practised with profit only on such cows as have produced all the calves wanted from them, are destined to furnish milk and finally meat for the butcher, or which, on account of sickness, age, or otherwise, can no more be used for reproduction, and have no other destination than the abattoir.

For fattening purposes, according to Charlier, the operation should be performed when the cow has attained the age of from six to eight years, after she has calved two or three times, and then she will be ready for butchering in about a year. He does not advise waiting longer, as the old cows give poor calves, in which the bony system predominates, give less abundant and less nutritive milk; they do not fatten easily, sometimes not at all, besides their meat is hard, fibrous and of inferior quality. Young cows, on the contrary, give better calves, more robust and less bony, more abundant and a better quality of milk, fatten more easily, and furnish a superior meat. In operating for the superior milking qualities, he considers forty days after the second or third calving to be the best time, as the cow then gives the most milk, and its advantages are more enduring. The meat is better in cows operated on for milk first, than where they are operated on especially to fatten; that is, if the cows are dried up before butchering; for if they are killed while giving milk the meat is not as good, the milk depriving it of much of its juiciness and flavor.

Ovariotomy has received but very little attention in this country, and no extensive scientific experimentation has been carried on. The operation per vagina is comparatively unknown amongst the mass of our veterinarians, and the operation through the flank little resorted to except by the spayers and gelders. They claim a very slight mortality, only one or two per cent., as the result of their operations, but facts prove that they meet with a very much larger percentage of loss, even considerably above that estimated by Gourdon, in France—15 to 18 per cent.

Our esteemed associate, Dr. Liautard, some ten years ago imported from France a set of the latest Charlier instruments, and met with very gratifying success in many cases in which he practiced the operation. His experience was presented to the U. S. Veterinary Association, and is the only report of the kind, of which I have any knowledge, that has appeared in this country. The instruments consist of a concealed knive with a short concave-edged blade, a speculum and a long straight ecraseur. The speculum is inserted into the vagina, holding it with the left hand and directing it with the right, to prevent injuring the mucous membrane of that organ. The projection on the end of this instrument is then inserted into the opening of the os uteri, and the right hand withdrawn to procure the concealed knife. This is passed into the vagina, and while pressing downwards and forwards on the speculum the incision is made in the same way that Charlier made it. However, I found that an incision large enough to admit the index and median fingers sufficed as a rule, instead of including the thumb as Charlier did, using those of the right hand in seeking the left ovary and vice versa. These fingers are then passed over the uterus, run along the cornua on whichever side you are seeking the ovary, then the fallopian tube is followed until the ovary is reached. This is brought gently to the opening in the vagina, where the thumb, though within the vagina, is carried back of the ovary, which organ is then readily shoved through the small but elastic orifice. The ecraseur is now inserted into the vagina by the independent hand, and the ovary and as much of the cord and broad ligament as is possible is introduced into the inclosure of the chain. Traction is now begun on the

chain by means of the screw without. This should be carried on slowly and under no circumstances should any drawing back of the instrument be practised, for this would produce strain upon the broad ligament. After both ovaries are extracted, whatever blood clots remain in the vagina may readily be removed by the hand.

(*To be Continued.*)

NEW RESEARCHES UPON PLEURO-PNEUMONIA AND ITS PREVENTIVE INOCULATION.

By Dr. Willems.

(*Continued from page* 361.)

B. The contagion of peripneumonia is again proved by this circumstance, that its spreading has been followed from its source in the remotest parts of the world.

Its first appearance, so far as we know its origin, was in 1750. This terrible scourge, which was to prove so disastrous, came from the mountains of Switzerland, passing on one side, on the Jura of the county of Berne, and on the other on that of France. From there it successively spread towards Germany, Holland, Italy, Belgium, England, America, &c., and more recently towards the Cape of Good Hope and Australia. The dates of the invasion in these different countries are well known.

It is thus that it will appear in others where it is at present unknown; for where no diseased animals have been imported, it will never be seen. This scourge has been unknown, in all the countries where it exists at present, until the introduction of calvi[illegible] animal. Still, in those countries the conditions of climate, of stabulation, alimentation, &c., are absolutely the same as those in which it prevails as an epizoötic.

As rinderpest, born in the steppes of Russia, sometimes is spread in countries where there is a great trade in cattle, and in war times especially, when it follows armies in the places of sup

ply, and thus transmits the contagion from the east towards the west, as we have seen, some years ago, a sad example at Hasselt; in the same manner pleuro-pneumonia is spread in an inverse direction; it travels from the centre of Europe towards northern and more rarely towards oriental countries, where it is always transported from the west. Once introduced in a country, it makes it its home and cannot be extripated except by the most rigorous hygienic measures; it is propagated by contagion from one animal to another, from one stable to another, and that especially in countries where the trade in cattle is very active, and where administrative and sanitary measures are less rigorously observed.

In a stable or in a herd, the contagious principle is spread over all the animals in the same way as the sun and light are. They have not all the same receptivity. This is why I have often seen the animals most distant from the affected subject afflicted first, and those which were nearest to him later. The disease may also be transmitted from one stable to another through the medium of the air loaded with the contagion; the transmission can also take place at long distances, as observed by some. This fact was confirmed by the experiments of the French Scientific Commission and by a very curious observation of Mr. Sluys, of Bernesters, reported in the *Landbouw Courant* of April 14th, 1870.

C. Contagion has been rigorously demonstrated, and spontaneity has not as yet. In favor of the last, there are only probabilities so far; the disease has never been created by the means of determined circumstances. Any attempt made to produce it spontaneously has failed, and the diverse circumstances in which animals were placed while under experiments, have only produced in them a greater disposition to become contaminated and to a shorter period of development.

All imaginary causes, so invoked by the spontaneites, such as bad stabulation, warm and damp and bad stables, too rich and exciting feeding, residuum of sugar houses or of distilleries, exposure to cold and damp air, too abundant secretion of milk, excessive work in oxen, &c.—all these causes, single or collected, have never given rise to a case of pleuro-pneumonia.

This terrible scourge carries on its disasters as well amongst the magnificent herds of the Netherlands and Australia, in the handsome stables of London and Paris, as in the infected barns of the distilleries, where cattle are so closely packed together and often exposed to many privations. Never in any of the most opposite conditions has a single case of spontaneous pleuro-pneumonia ever been recognized.

Numerous experiments have been made with the effect of making the disease appear spontaneously.

Here are those made by the official commission of Prussia, published in *Der Landwirth*, of Dec. 6th, 1871, and reported by Dr. Ulrich, Royal and Departmental Veterinarian at Breslau. He says: "Pleuro-pneumonia ought to be considered as contagious. The experiments of the Agricol Society of Ober Barnim and many others, and the official commission of Prussia, have proved evidently that the disease is communicated very easily by contagion. Doctor Krauss, reporter of the committee of the Agriculturists' meeting in 1873, to decide the question, warmly opposed the fact that pleuro-pneumonia was contagious, and the next day, from observations made at Mœglin, was obliged to acknowledge his error. In the same way, Doctor Wagenfeld, Veterinarian of Dantzig, published an article, generally considered as the best of its kind, in which he opposed the idea of contagion, and still, in his Veterinary Encyclopedia, published later, changes his views and declares it to be very contagious.

The Royal Agricultural Academy of Mœglin proposed to resolve the problem whether pleuro-pneumonia was only contagious or spontaneous, and made experiments which lasted 10 years * * * and, says Mr. Ulrich, "have proved that the disease never appeared with us spontaneously, but always by introduction of a sick animal and spreading of the disease by contagion." Bouley writes the same opinion (*). Prof. Gamgee says, in his report to the United States Government, "pleuro-pneumonia rises only by the influence of contagion." The commission of the Netherlands is of the same opinion. In

* Recueil de Medecine Veterinaire, Sept. 15, 1870.

the meeting of Nov. 3d, 1878, all the Veterinary Societies of northern France expressed the opinion that "it can never rise spontaneously."

By the above it is proved that pleuro-pneumonia proceeds exclusively from contagion, and consequently it belongs to veterinary science to indicate the measures to be taken to stop its spreading, and it becomes the duty of the government to prohibit the transport and sale of suspected animals, as they are the sources from which contagion proceeds through expired air, discharge from the nose, soiling of trucks, &c., &c.

II.

Exudative pleuro-pneumonia is inoculable and infectious; it is transmissible from one animal to another by inoculation of the pathological products and by contagion or volatil virus. When in 1852, I proclaimed the inoculability of bovine pneumonia, I met with many who were incredulous. However, since then, M M. Villemin, Chauveau, Saint-Cyr and others, have admitted the probability of inoculating diseases of the chest, and especially pulmonary phthisis, the best known and unfortunately most spread, as it carries off one fifth of the population of the globe.

Exudative pleuro-pneumonia depends for introduction into the economy of the virus or contagious principle, no matter how, either through the intermediate of the air, upon the mucous membrane of the bronchia and lungs, perhaps even also upon a denuded part of the body of the animal, where absorption can take place, either by direct inoculation in the cellular tissue of the dermis, or anywhere else.

Once introduced in the body of the animal, the contagion produces first a local alteration of the tissues, an inflammatory process, soon followed by general troubles which are the manifestation of the disease. But what is the cause of this inflammatory process? It is not an ordinary inflammation of the tissues; it is peculiar and specific.

Pleuro-pneumonia is a general disease, accompanied with fever, manifested by chills, dullness, tympanitis of the abdomen, first

constipation and then fœtid diarrhœa, sometimes convulsive motions of the head and body, grinding of the teeth, &c.

In the affected tissues, one finds infiltration of a matter of exudation which fills up the connective tissue, either ordinarily in the lungs, when the disease is taken by contagion, or upon the point where inoculation has been made. Infiltrations of serous liquid are often seen when pleuro-pneumonia is in an advanced stage, as also after inoculation, in the pleura, pericardium, peritoneum, cellular tissue surrounding the trachea, in the liver, the muscles, etc.

When the disease is far advanced, it affects almost all the organs, as proved to me by the numerous autopsies I have made; even muscles are impregnated with a gelatinous exudation.

This plastic exudation may be carried anywhere else than the lungs; it is not even absolutely necessary to the existence of that affection. I have met animals affected with exudative pleuro-pneumonia without pulmonary lesions; the liver presents sometimes a plastic infiltration analogous to that of the lung. It is a fact of observation, noted by several experimentors, amongst which are M.M. Delafond, Zundel, and H. Bouley. The latter says: "The virus of peripneumonia can saturate an organism and protect it from further attacks of this disease, without, however, manifesting its presence by the inflammatory disease of the lungs and the plastic transudations belonging to it."

The autopsy of animals which have died from inoculation show the same cadaveric lesions as are found in those which have succumbed to the disease.

"What veterinary surgeons inoculate," says M. Paul Cagny, a young and learned veterinarian, "is peripneumonia with all its virulency; the local symptoms only differ from the disease inoculated naturally, or those from that introduced by the lancet. This is due to the anatomical organization first, and again to the physiological action of the organs at the point of inoculation. It is for that reason that inoculation on the dew-lap had to be abandoned."

These very great alterations cannot be explained but by a deep modification in the constituting elements of the blood which

reacts thus upon the whole organism. These infiltrations of plastic matter in the places where inoculation has been made and where there is abundance of connective tissue, often take so rapidly and abundantly, on the dew-lap for instance, that the animal succumbs soon to them.

That is what was observed in the unfortunate inoculations, imprudently made by M. Cloes, at the castle of Herkenrode, near Hasselt, where almost all the animals inoculated on the dew-lap died. The lesions of the muscles are identical to those of the lungs ; here again it is the interfascicular connective tissue which is the seat of the infiltration.

When one incises these swellings, the quantity of liquid which escapes may be valued at several liters a day. These swellings generally assume extraordinary size, cover large surfaces of tissues and look like hepatized lungs, in which some tissues weigh as much as 20 or 30 kilogrammes.

Exudative pleuro-pneumonia ends ordinarily, whatever is done, in the death of the animal by asphyxia; the lung, most often the right, and sometimes both, is so much filled with the characteristic exudation that it becomes impermeable. If the patient does not die with asphyxia, the lung being only partly hepatized, the disease hangs on and most of the organs, especially the liver, become infiltrated, the intestines present inflammatory patches, exudations of serosity take place in the splanchnic cavities in the cellular tissue, the muscles become soft, etc., and the animal succumbs after several days of the disease.

Sometimes animals suffer only slightly from the effects of contagion, and recover rapidly; but at other times, in exceptional cases, the disease ends by the encysting of a part of the lung, which forms a sequestrum, ordinarily very hard, in the middle of the parts of the lung still healthy, and the animal may thus live quite a long time in an apparent state of health. These very curious lesions are found only when the animal is destroyed for consumption.

This phenomena is altogether like that observed by M. Pasteur in chicken cholera. He says: "In the cases of recovery, the parasite is stopped little by little in its development, and disap-

pears at the same time that the muscle hardens and lodges itself in a cavity whose whole surface resembles that of a granulating wound of healthy nature. The necrosed part finishes by forming a sequestrum, so well isolated from the cavity where it is contained that one feels it under the finger, through the skin, in the interior of the muscle, and by the smallest incision can take hold of it with the fingers and extract it.

(*To be continued.*)

EXPERIMENTAL ANALYSIS

OF THE MALIGNANT PUSTULE AND CARBUNCULOUS ŒDEMA; DETERMINATION OF THEIR VARIOUS FORMS AND OF THEIR DEGREES OF VIRULENCY.

By M. COLIN, of Alfort.

Continued from page 366.

Therefore, though everything has seemed identical at first in our two animals, the carbuncular process has changed character at a given time. In remaining localized in one, it has allowed the virulency to die out *in situ*. In spreading in the other, it has extended to the whole of the organism. In the first case, the lymphatic system has remained healthy; in the second, it became affected, and as a mean of connection between the starting point and the rest of the economy.

If we wish to have the material proof of the intervention of the lymphatic glands in the morbid process by which anthrax is generalized and become fatal, let us take again two dogs, I mean two adult sluts: Let us insert on one the virulent liquid in the mammæ, in front of the pubis, near the ganglions, and on the other, on the contrary, in the anterior mammæ between the umbilicus and the abdominal appendage of the sternum, consequently quite far from the inguinal and axillary ganglions. On this one,

the carbuncular tumor will remain small and will subside after the third or fourth day without giving rise to general accident. On the first, the tumor will rapidly develop, assume enormous proportions, be surrounded by large swelling, the prepubic inguinal bubons being very large and very painful. All that by the second day. There will be general intense fever, injection of mucous membranes, the temperature will rise to 41⅞ ° to 42°, the general infection will appear imminent. Death may take place the fourth or fifth day, with extensive lesions of the lymphatic system, of the spleen, intestines, &c.

It is on killing animals at different periods of the evolution of our malignant pustule that we have been able to understand, sometimes the boundaries of accidents, sometimes their progressive march or their more or less rapid extension to the whole of the organism. Here is what we have observed:

At the onset, that is, as far as the 12th, 20th, or even the 24th hour after the insertion of the liquid, the phenomena are the same in all cases. The morbid process is purely local; the irritation of the skin and of the tissues does not extend beyond a radius of a few centimeters; the œdema remains circumscribed; the volume or aspect of the lymphatic glands has not changed.

But from the 24th to the 48th hour, the first ganglions nearest to the pustule become diseased; the cellular envelope is infiltrated, their blood vessels dilated, their tissue becomes rosy, then red, by degrees purplish, and sometimes blackish; they swell and have a tendency to break up into pulp, especially in the centre. The first buboes thus formed may, if very near the tumor, mingle with it and with the common œdema.

It is in a successive manner that ganglions become diseased, and as they are on the way of traveling of the virulent elements. After the mammæ and the inguinal, in the case of the pustule being near the posterior mammæ, the pelvis, then the lumbar, thoracic, even the axillary become tumefied in one half of the body, if the pustule does not occupy the median line.

A noticeable time, sometimes even quite long, may transpire between the lesion of the first or fourth ganglion and that of the following. It seems that the first saturate themselves with viru

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A noticeable time, sometimes even quite long, may transpire between the lesion of the first or fourth ganglion and that of the following. It seems that the first saturate themselves with viru

lent elements before sending them to the following, and that they only give up what they may have received or elaborated in excess. The steps in the arrest which separate the infection of a ganglion from that of another are of variable duration. In being far apart, they seem to constitute one of the principal obstacles to the development of general accidents.

Ganglions do not act alike in all cases of carbunculous tumors. If the pustule is to remain a local accident, they do not take any part in the morbid process; they limitate or circumscribe it. If that pustule is to bring on a general infection, they are successively transformed into bubons, which act the part of internal malignant pustules added to the first; the centers of infection are consequently multiplied in proportion to the number of those organs. There is only one, if the pustule remains isolated; there are three, four, five and more, if anthrax has spread through the whole lymphatic system. Thus we can understand the seriousness of the malignant pustules of the region of the head, of the neck and chest, where ganglions are so numerous.

In the point of view of the pathogeny, the entire evolution of a carbunculous disease proceeding from a malignant pustule comprehends five periods. The first corresponds to the development of the pustule, the second as a step of arrest, the third corresponds to the successive development of bubons and malig nant ganglionar pustules, the fourth is another step of arrest, and the fifth is that of a general infection of the blood and of all the organs.

These five steps that anatomical examination allows to distinguish in the evolution of anthrax, are also distinguishable by experimentation for virulency, and indicate and measure them. At first, this property belongs to the tumor only, even limited to the center of the tumor; later it extends to the ganglions, and finally to the mass of the blood. The intervals which separate them may be very long. Virulency is plainly realized in the pustule before showing in the ganglion; it is in this long before it is noticeable in the blood or other parts of the blood. The intervals must not be overlooked, for those are the moments when the disease may limit itself, when virulency may die out.

Thus, when the disease is to remain local, the step of arrest following the evolution of the pustule is that where it may lose its virulency. Sometimes, as I will demonstrate later, the virulency already developed to a certain degree in a ganglion, dies out in that organ before the time when it might have appeared in the blood.

The attentive study of the malignant pustule of animals apparently refractory to anthrax or little predisposed to it, then proves on one side that this pustule is a complete virulent anthrax, no matter how localized it may be; it proves on the other side that the generalization of this local condition operates, if not exclusively, at least principally through the intermediate of the lymphatic system, as every time this system remains indemn, the disease aborts and is followed by no serious consequences. Of course it is difficult to say why, in cases apparently identical, this system may remain nearly indemn in such subjects, while in others it becomes the seat of deep lesions. Its more or less marked development according to the individuals, its different degrees of susceptibility, do not suffice to explain these differences. What is certain, however, is that in the young age, at the time when the animal enjoyes all its activity and strong impressionability, anthrax becomes frequently general as sequelæ of malignant pustule.

It is evident that the lymphatic system, especially its ganglions, plays here an essentially special part. If it was limited to absorb virulent agents, to transport them in the circulation with the lymph, it would already do so, and the material that it carries would rapidly reach its destination. In conclusion, let us remark that in all cases of carbunculous tumors or malignant pustules without lesions of the lymphatic glands, the virulency of the tumor dies out quickly, and general infection is prevented. This fact of the spontaneous extinction of virulency, far from being exceptional in dogs and the other animals which take anthrax with difficulty, becomes the rule; for in adult age it may be seen nineteen times out of twenty. The bacteridie, though disseminated in the canal of the tumor, in its tissues and blood vessels, in the surrounding œdema, dies there, and dies whether the irritation

be slight or severe, whether or no there is serous exudation, suppuration, ulceration, gangrene. This bacteridie or its germs, which, it is said, are preserved, even cultivated and grow in the cadaver, in putrified matters, dry or damp, for long years, die or are destroyed in a few days in the best carbunculous tumor, the richest in cellular tissue and blood-vessels, and the most impregnated of lymph or extravasated serosity. Indeed, all the pustules without fatal sequelæ that I have examined from the beginning to the end, had lost virulency and bacteridies from the fifth and sixth day; sometimes sooner. From this time neither the liquid from the canal or from the phlyctens, nor the pus, serosity or blood obtained by scarifications, nor the slough of the escharre diluted in water, have produced anthrax either in the rabbit or Guinea pig. The essay of these products has been carried out as far as the twelfth or fifteenth day, always with negative results.

To judge of the value of the objections which would consist in saying: the bacteridie is not destroyed in the tumor, it is carried off by the circulation—I have looked for it in the remains of the infiltrations, in the spleen, the ganglions, the liquid of the thoracic duct, the blood, and even in some of the products of secretion, and that specially by the method of inoculation; those always remained sterile.

It does not belong to me here to inquire why this ærobic being lives, or seems to live, in a tumor closed for several days, dies there, or disappear after the dehiscence of that tumor; why its disappearance corresponds exactly with the work of resolution or serous exudation, of suppuration, of the slough of the eschar. For the present, I can only state facts.

To resume, animals known as refractory to anthrax contract malignant pustule, very well with or without œdema. This pustule or tumor takes many various forms, according to the points of the body where it develops itself. It aborts in parts where the skin is thick, and the cellular tissue dense; it grows, on the contrary, with rapidity and assumes enormous proportions where the skin is thin, rich in lymphatics, in the neighborhood of ganglions, especially in the groin and on the mammæ; it is most often complete from the twenty-fourth to the forty-eighth hour.

In all cases, without exception, the tumor is virulent; by the serosity of its canal, its blood, its extravasated liquids as by its œdema. This virulency lasts several days and gradually dies out, from the seventy-second to the eightieth hour, even often from the forty-eighth.

The pustule disappears either by simple resolution, without opening, or after having serosity oozing out, in giving a dry eschar, in suppurating or ulcerating extensively. It moves spontaneously with any one of these modes of transmission in nine-tenths of the cases of the adult subjects.

Every time that the carbunculous tumor is accompanied with extensive lesions in the lymphatic ganglions, it has a tendency to produce a general state which often becomes fatal, especially in young animals.

In the point of view of the diagnosis, microscopic examination of the elements and products of the tumor is far from furnishing positive characters; for the tumor, of surely carbunculous nature, may not show any bacteridie in several of its products or layers, and the inoculation of those may remain sterile. And again, the virulency being ephemerous in the tumors that do not kill, it weakens and disappears without appreciable cause before the moment of resolution, of ulceration or any other mode of transmission.

Considering the prognosis, the physical and microscopical characters of the tumors leave also the observer in doubt. The small tumor, with slow growth, which gives no anxiety, brings on general accidents and death as well as the most voluminous tumor, grown with rapidity.

I conclude in giving as proofs and explanations, two tables, one indicating, in chronological order, the animals of canine and feline species upon which inoculations have developed accidents, followed by recovery or death; the other showing the animals where inoculation remains sterile:

The experiments of these tables are 153 in number. The mortality has been only of 23 in 153, or 14 per cent., though there has not been any treatment; 130 remained sterile. In 62 cases

accidents followed, and in 23 these were fatal, especially in young subjects.

In 91 cases carbunculous inoculations remained sterile. In deducting the young subjects, the mortality remains about 5 per cent.

EDITORIAL.

What action will the United States take in relation to contagious diseases of domestic animals, when the new Administration come to power?

What will the Legislatures do in those of our States where the diseases are prevailing more or less; and, specially in those which are infected with pleuro-pneumonia?

These questions are of no small importance, and while they will be of great influence in those parts of the world where our cattle trade is of paramount value, will at the same time be of no less vital interest and be anxiously looked for by our people.

That the United States are not ignorant of the greatness of the subject is manifestly evident by the partially successful attempts made two years ago in some of the eastern States, and also by the investigations made by the Department of Agriculture at Washington, through its special agent, Mr. C. P. Lyman, who has sent his report, and if we are to believe the extracts made from it by some newspaper correspondents, is reported to have given to understand that pleuro-pneumonia exists in our western States, as from extracts which we read in those papers he is said to have written that, "we have this dreaded cattle scourge established amongst our western herds, that Chicago, Buffalo, Albany, Boston and Portland, are diseased centres." * * * (†)

The fearful importance of that statement cannot be measured, and while we do not believe in the correctness of the idea thus advanced by our esteemed friend, a disbelief which in us is not only strengthened by all that we have heard and read on the matter in

† N. Y. Times, Dec. 14, 1880.

western papers, but which the doctor denies entirely, we cannot avoid thinking how much more difficult the task of getting rid of the disease would be if the report is correct—indeed, would it be possible then to stamp out this fearful disease?

We have been told again and again that the eastern States, and few of them at that, were the infected ones, and now this limited ground is made to spread to our western markets!! Where do the diseased cattle come from? Where does the extent of the disease stop?

Will the problem of eradicating the disease by stamping out be attempted? or will other means be recommended so as to annihilate the disastrous effects of the disease?

Will the General Government establish the Veterinary Sanitary Department, which has so often been recommended by veterinarians as well as by those interested in agricultural pursuits and investigations?

Will the respective States make other attempts, and appropriate funds for the carrying out of measures which would have most probably proved successful had they not been suddenly stopped on account of lack of funds to be placed in the hands of Boards of Health, whose labors is to say the least useless?

Can the question of State rights be overlooked and general legislation be created by which one and all States will be submitted to similar sanitary laws? Why not. If the National Board of Health has succeeded in organizing their work, why would a Vetinary Sanitary Board be less successful?

And again, if such organization or bureau was created, under what department would it be placed?

All these are questions the solution of which all people interested in cattle trade, are anxiously looking for, and to which no veterinarian in the country will remain indifferent, if he fully realizes the importance of the part he will have to fulfil when the laws which will solve these problems will have to be executed.

THE veterinary profession of England is already heavily indebted to Mr. George Fleming for the immense amount of good

work he has done in its behalf. Not satisfied with the good already realized for veterinary English literature by the numerous works he has written, and which to-day are found in the libraries of every practitioner and in the hands of every veterinary student, nor by the improvement he has obtained in the military veterinary service, he now turns his attention to the position of the civilian veterinarian and wants him to be protected from quackery. A bill is to be introduced in the forthcoming session of Parliament for the protection of the title of Veterinary Surgeon, and no doubt, pushed by Mr. Fleming, and backed by the intelligent wealth of England and by the medical profession, will soon become a law, and then the day of coachmen, grooms, farriers and blacksmiths styling themselves veterinary surgeons will soon be over. How much the United States are in need of similar legislation, our readers know. But when will we be able to announce this great step in the advancement of a science which in this country is yet but in its infancy?

HUMAN AND ANIMAL VARIOLÆ: A STUDY IN COMPARATIVE PATHOLOGY.

By George Fleming, F.R.C.V.S., Army Veterinary Inspector.

(From the Veterinary Journal, London, England.)

(*Continued from p.* 391).

I have already alluded to the results of small-pox inoculations on the horse, and shown that, as on the ox, they were either negative or nearly so, the positive results yielding only the most trifling evidence of infection, and nothing at all like horse-pox being ever produced from the insertion of the small-pox virus into the skin of the horse, while re-transmission to mankind only gave rise to small-pox. On the contrary, as we have seen, horse-

pox inoculated on the cow produces what in every way corresponds to cow-pox, or on man to vaccinia. From the cow and man horse-pox can be transmitted indefinitely; and while its action is modified by repeated transmissions, its protective influence against variola is undiminished. This has been demonstrated times almost without number, from the days of Jenner up to the present date. The most interesting and instructive of recent demonstrations in this direction is that recorded by Dr. Pingaud, in a communication presented to the Paris Academy of Medicine a few months ago. Having observed, with Drs. Viseux and Thomas, an epizoöty of horse-pox in February, 1879, he determined to make some experiments, and selected as a vacciniferous subject a four-years-old horse affected with the disease, but whose antecedents were well known, and whose health at other times was excellent. The cutaneous eruption was discrete; there were only a few crusts of pustules about the hollow of the pasterns; but in the mouth, and within the upper lip, the mucous membrane was studded with vesicles offering the characteristic nacrous aspect. Lymph was collected from these pustules with the greatest care, and seven young soldiers of the 10th Hussars, who had not been vaccinated, were inoculated. On the sixth day, six of the men showed at the seat of inoculation the characteristic vaccine vesicles, which had a somewhat inflamed base. From four of the soldiers lymph was taken; with this sixty-four men—eight of whom had not been vaccinated—were inoculated. In forty of these the result was positive—sixty per cent. successful vaccinations. With none of the patients were there any serious inflam matory symptoms, and only in a very small number did the inoculations assume a furunculous aspect. Calves were inoculated from the horse, but the proportion of successes were only 48 per cent., rather going to prove that the virus became weakened in the calves.

On May 5th, 1880, a case of horse-pox was discovered in Paris among the horses of a German horse dealer. A three-months-old heifer was inoculated on May 5th, with matter from this horse, the inoculations being made by three punctures on the udder. The result was a complete success; and from this animal another

heifer was as successfully inoculated on the 13th of the same month. On the 19th there was a very fine vaccinal eruption, no fewer than sixty pustules being developed. Two other heifers were vaccinated from these, and so abundant was the lymph on the consecutive eruption that the Société d'Hygiène was well supplied with material for vaccination purposes. In September of this year also, there was so severe an outbreak of horse-pox among the race-horses at Chantilly, near Paris, that several of them had to be struck off their engagements.

I have stated that horse-pox and cow-pox are almost, if not quite identical in their effects, when transmitted by inoculation to man, the ox, or the horse. Chauveau inoculated five horses and two asses with animal vaccine from Naples; the youngest animal was seven years old, the others from sixteen to twenty years of age. For five and six days there were no signs, but in from five to eight days the seat of puncture became markedly papulous, the papules increasing in size until about the tenth day, when they were acuminated, had a very broad base, and were red, painful and hard. From the ninth to the twelfth day was the period of secretion, the epidermis becoming slightly raised throughout the whole extent of the papule by an exudation of limpid citron-colored serum; this dried into yellowish transparent crusts, very different in appearance from those of vaccinia in man or cow. The secretion from the lymph continued for several days, and ceased from the thirteenth to the seventeenth day. When the crust was removed there appeared a moist granular red surface level with the skin, but having a deep central cavity, a kind of umbilicus, in which had been fixed, like the head of a nail, the prominent under surface of the crust. There was no febrile reaction. In the asses there was shedding of the hair and epidermis in various parts, with abundant serous exudation. As compared with its evolution in man and the cow, the vesicle or pustule was slower, and there was a difference in its shape and character, the pustule being acuminated, the lymph scanty, and the umbilicus small or altogether absent; though in an ass sixteen years old the pustule had from the commencement a central umbilicus. In the horse the crust extends over all the pustule, while in man and

the cow only the centre is covered. In the ox the lymph is rarely abundant, and there is never anything more than a thin brown crust; but in the horse the crust is wide, thick, rough on the surface, transparent and citrine-tinted.

Before leaving the subject of horse-pox, it may be observed that Spinola remarked that the low-lying regions along the Baltic appeared to be more infested with the disease than elsewhere.

SHEEP-POX.

Sheep-pox differs from cow and horse-pox in having a history extending over some centuries, and closely in resembling small-pox in its extension—this depending not only on its contagious but also on its infectious properties—and the eruption being more or less general over the body. Indeed, so far as intensity of virulence is concerned, its appearing in an epizoötic form, as well as the serious symptoms and mortality accompanying sheep-pox, there is the closest resemblance between it and human variola. We have seen that cow-pox and horse-pox are far from being serious disorders, the affected animals, in the majority of instances, being very little, if at all, disturbed in health, while the diseases are not infectious, and not always very contagious.*

* Depaul believed horse-pox to be infectious, and cites, in support of his opinion, an instance in which a cow was inoculated with the lymph from the nostril of a horse, when seventeen other cows, inhabiting the same shed, were soon after infected, cow-pox pustules appearing on the udder and teats. In addition, a horse kept in a badly-constructed box in this stable, and breathing the same atmosphere as the cows, was also affected, the eruption showing itself on different parts of its body. It is not at all improbable, however, that the cow-keeper and his assistants, who handled the diseased and healthy animals alike, were the chief agents in spreading the malady. Indeed, the wife of the cow-keeper, in milking the cows, was vaccinated on one of her fingers, and yet continued to handle the teats of the others, notwithstanding the pain she experienced. Bouley has had perfectly healthy horses and cows cohabit with diseased horses, and when the malady was produced in them he was always able to trace it to direct contact. During the epizoöty at Alfort, in 1863, it was possible to transmit the horse-pox to a series of horses by placing them one after another in a stall which had been occupied by a diseased horse. Each animal became affected in turn, and at times its immediate neighbors also; but beyond those in that stable there were no further transmissions, all the other horses remaining unaffected. As Bouley justly remarked, a really infectious disease does not comport itself in this manner. Veterinary Surgeons Turenne and Mathieu have also experimentally demonstrated that horse-pox is not infectious, and this is in accord with my own experience.

In the first portion of this paper, I alluded to sheep-pox being mentioned at the Vaccination Conference, and observed that it was there admitted that the sheep had a variola of its own. On again looking over the report of that meeting, it appears doubtful whether the speaker who referred to it thought it was peculiar to the sheep, or whether it was not also derived from human variola. The best proof that it has no relationship whatever to small-pox, is to be found in the fact that it prevails continuously, and sometimes most extensively and fatally, in countries where small-pox is extremely rare, as in East Prussia; and in regions where the latter is never absent, and is often epidemic, sheep-pox is only known as an imported disease. In England it is never seen unless introduced from countries where it is enzoötic. The terrible outbreak which ravaged our flocks in A.D. 1276, and continued twenty-eight years, was due to importation from France; and the appearance of the disease in 1847 and 1862 was due to foreign sheep. It has been unknown in the country since the latter date.

Notwithstanding the close resemblance of sheep-pox to small-pox (the pustules in the former being, however, acuminated, but the course of the malady is very similar, the complications the same, and the mortality as great), yet the one disease has no influence either in the production of or protection from the other. It appears to be finally established that human variola will no more produce sheep-pox than it will cow-pox, notwithstanding the close affinity between the two; and while variolation will not protect from sheep-pox, neither will inoculation with the virus of the latter prevent mankind having small-pox.

Some authorities have denied that ovine variola can be transmitted to the human species; and the extreme rarity of cases of supposed accidental transmission certainly gives countenance to the opinion. But several instances are recorded, nevertheless, of veterinary surgeons who have been accidentally inoculated with the virus, suffering from local and general disturbance, like that produced by vaccination.* Korner† reports that a child who

* See "Medizin. Jahrbuch des Oesterreich. Staates"; also "Mittheilungen aus der Thierärztlichen Praxis in Preussen," Jahrgang 17; and "Magazin für die gesammte Thierheilkunde," 1873, p. 467.

† "Mittheilungen auf der Thierarztlichen Praxis in Preusschen Staate für 1876-77 und 1877-78."

tended (barefoot) sheep affected with variola, had a number of discrete and confluent pocks on both feet. This transmission occurred also to one of Korner's own children. On the back of the boy was developed a pock, which finally became as large as a five-pfening piece; there was severe comcomitant fever. The child appears to have been inoculated while Korner was charging some capillary tubes with sheep-pox lymph from a pipette, a drop of the fluid, it is supposed, having fallen on him.

Röll has unsuccessfully attempted to inoculate cattle with sheep-pox, and sheep with cow-pox; but Zundel* has given an instance in which two cows were directly infected through cohabitation with diseased sheep. Haubner mentions that inoculation with small-pox matter has sometimes produced pustules on the dog and pig; but reinoculation from these did not cause the malady in sheep. Hertwig and Hering assert that the malady is readily communicated to goats in a true form, and may be transmitted from them to sheep. In the goat the pustules are usually smaller, according to Giesker, and the general disturbance is less marked. But transmission is very far indeed from certain, as goats very often associate with sheep without becoming affected Hering knew of an instance in which fifty-four goats grazed with diseased sheep, and only ten became sick. According to Kersten, Lenherdt, Spinola, and Gerlach, reciprocal inoculation of goats and sheep is always successful; while according to the observations and experiments of Gasparin, Dominick, Curdt and Spinola, and, still more recently, Gerlach, there appears to be a close identity between the variola of hares and rabbits and that of sheep, inoculations from one species to the other always yielding positive results.

Sheep have a kind of variola known to the Germans as "Steinpocken" or "Aaspocken" (*Variola tuberceuosa*, *Varicella ovium*). It has been described by Haxthausen,† Hoftrichter,‡ and Hering.§

* "Journal de Méd. Vétérinaire de Lyon," 1867, p. 185.
† Rust's Magazine, band 29.
‡ Henke's, "Zeitschrift," 1831.
§ "Specielle Pathologie und Merapie für Thierarzte," p. 389.

When vaccination as a protection from small-pox began to gain ground, as its benefits were becoming more and more evident, many of the leading veterinarians on the Continent tried it as a protective against sheep-pox; but they soon discovered that vaccinated sheep were as susceptible to their own particular variola as the unvaccinated. Verrier, Goher, Husson, Voison, and other veterinary surgeons, found that, no matter how successful the vaccinations had apparently been, the sheep took the disease, either accidentally or experimentally, as readily as before. For this reason vaccination is never attempted now, as it does not confer immunity from sheep-pox—a curious circumstance with regard to inter-variolization among different species of animals.

The contagium of sheep-pox is very active, as has been already stated. The observations and calculations of Chauveau with regard to the infectiousness of the malady, compared with that of vaccinia, tend to prove that animals attacked with sheep-pox will infect a hundred times more readily than those affected with cow-pox. The sheep-pox lymph also, according to the same authority, contains in an equal volume and weight a much more considerable number of virulent corpuscles, and is much more potent than that of vaccinia. He has shown that if the latter is diluted with fifty times its weight of water, inoculation with it is uncertain in its result, while the sheep-pox matter may be diluted with 1500 times its volume of water before it is reduced to the same condition. He has also demonstrated that the activity of this matter, like that of every other virulent substance, resides in the solid particles or elementary corpuscles held in suspension in the serum, which is not viruliferous; and that an equal quantity of sheep-pox lymph contains thirty times more of these particles than that of vaccinia.

It may be remarked that in Australia, New Zealand, and the American Continent, sheep-pox has never been seen, because it has not been carried there. Yet human small-pox, imported from the western world, is as prevalent in those regions as with us. This should be convincing proof that there is no relationship between the two variolæ, so far at least as their contagious principles are concerned.

(*To be continued.*)

HONORARY ASSOCIATES OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.(*)

The following is the list of Honorary Foreign Associates elected by the Council of the Royal College of Veterinary Surgeons, on the nomination of the President, at the quarterly meeting held on October 13th. We regret that there is not space to insert their claims to this high distinction, but their names will be familiar to many of our readers :—

FRANCE.

Henri Bouley, Inspector of the French Veterinary Schools, ex-President of the Paris Academy of Medicine and Professor of Physiology at the Sorbonne.

A. Chauveau, Doctor of Medicine, Director of the Lyons Veterinary School, Professor of Comparative Pathology at the Lyons University.

F. Saint-Cyr, Professor at the Lyons Veterinary School.

C. Baillet, Director of the Toulouse Veterinary School.

M. Toussaint, Doctor of Medicine, Professor of Physiology at the Toulouse University and Veterinary School.

A. *Goubaux*, Director of the Alfort Veterinary School.

G. Colin, Professor of Physiology at the Alfort Veterinary School.

E. Decroix, Principal Veterinary Surgeon to the French army.

P. Megnin, Laureate of the Institute of France, Army Veterinary Surgeon.

GERMANY.

F. Roloff, Doctor of Medicine, Director of the Berlin Veterinary School.

C. F. Mueller, Professor at the Berlin Veterinary School.

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*From the Veterinary Journal.

J. W. Schutz, Doctor of Medicine and Professor at the Berlin Veterinary School.

W. Dieckerhoff, Professor at the Berlin Veterinary School.

C. H. Hertwig, Doctor of Medicine, ex-Professor at the Berlin Veterinary School.

E. F. Gurlt, Doctor of Medicine, ex-Professor at the Berlin Veterinary School.

K. Gunther, Director of the Hanover Veterinary School.

C. Harms, Doctor of Medicine, Professor at the Hanover Veterinary School.

L. Franck, Director of the Munich Veterinary School.

O. Bollinger, Doctor of Medicine, Professor at the Munich Veterinary School and University.

E. Hering, Doctor of Medicine, late Director of the Stuttgart Veterinary School.

W. Fricker, Director of the Stuttgart Veterinary School.

F. A. Zürn, Doctor of Medicine, Professor of Veterinary Medicine at the University of Leipzic.

G. C. Haubner, Doctor of Medicine, Director of the Dresden Veterinary School.

A. O. Leisering, Doctor of Medicine, Professor at the Dresden Veterinary School.

A. G. Siedamgrotzky, Doctor of Medicine, Professor at the Dresden Veterinary School.

J. E. L. Falke, Doctor of Medicine, Professor at the University of Jena.

A. Lydtin, Veterinary Adviser to the Baden Government, Carlsruhe.

G. Plug, Doctor of Medicine, Professor of Veterinary Medicine at the University of Giessen.

H. Putz, Doctor of Medicine, Professor of Veterinary Medicine at the University of Halle.

A. Zundel, Government Veterinary Surgeon at Strasbourg.

H. Amacker, Doctor of Medicine, Government Veterinary Surgeon, Dusseldorf.

T. Adam, Government Veterinary Surgeon, Augsburg.

C. F. Heusinger, Doctor of Medicine, Erlangen.

AUSTRIA.

F. M. Roll, Doctor of Medicine, late Director of the Vienna Veterinary School.

F. Mueller, Doctor of Medicine, Director of the Vienna Veterinary School.

O. Bruckmuller, Doctor of Medicine, Professor at the Vienna Veterinary School.

L. Forster, Doctor of Medicine, Professor at the Vienna Veterinary School.

Tormay Adalbert, Director of the Veterinary School at Buda-Pesth.

BELGIUM.

A. Thiernesse, Director of the Brussels Veterinary School.

J. M. Wehenkel, Doctor of Medicine, Professor at the Brussels Veterinary School and University.

M. Laho, Professor at the Brussels Veterinary School.

A. Degive, Professor at the Brussels Veterinary School.

E. Dele, Government Veterinary Surgeon at Antwerp.

ITALY.

J. B. Ercolani, Count, Doctor of Medicine, Director of the Veterinary School at the Bologna University.

N. Lanzillotti-Buonsanti, Doctor of Medicine, Director of the Milan Veterinary School.

E. Perroncito, Doctor of Medicine, Professor at the Milan Veterinary School.

M. Guzzoni, Doctor of Medicine, Professor at the Florence Veterinary School.

D. Vallada, Director at the Turin Veterinary School.

R. Bassi, Professor at the Turin Veterinary School.

S. Rivolta, Doctor of Medicine, Professor at the University of Pisa.

S. Oreste, Director of the Naples Veterinary School.

A. De Silvestri, Professor at the Turin Veterinary School.

J. Generali, Director of the Modena Veterinary School.

P. Delprato, Director of the Veterinary School at the University of Parma.

HOLLAND.

A. W. H. Wirtz, Director of the Veterinary School at Utrecht.
T. C. Heckmeyer, Professor at the Utrecht Veterinary School.

SWITZERLAND.

R. Zannger, Doctor of Medicine, Director of the Zurich Veterinary School.
V. Nierderhausern, Director of the Berne Veterinary School.

RUSSIA.

P Seifmann, Director of the Kasan Veterinary School.
F. Unterberger, Director of the Dorpat Veterinary School.
E. Semmer, Professor at the Dorpat Veterinary School.
H. Schmoulewitsch, Veterinary Adviser to the Minister of the Interior at St. Petersburg.

DENMARK.

H. Krabbe, Doctor of Medicine, Professor at the Copenhagen Veterinary School.

SWEDEN AND NORWAY.

N. E. Forssell, Director of the Veterinary School at Skara.
J. G. H. Kinberg, Doctor of Medicine, Director of the Veterinary School at Stockholm.
C. Lindquist, Professor at the Stockholm Veterinary School.

UNITED STATES OF AMERICA.

A. Liautard, Doctor of Medicine, Director of the American Veterinary College, New York.

SOCIETY MEETINGS.

MONTREAL VETERINARY MEDICAL ASSOCIATION.

This Association held its regular fortnightly meeting in the lecture room of the Veterinary College on Thursday evening last, the President, Mr. C. J. Alloway, V.S., in the chair. A full attendance of members was present. The Secretary stated to the meeting that a number of new books had recently been added to the library, which now amounts to upwards of 300 volumes, and that new catalogues were in course of preparation, and would be ready for distribution at next meeting, after the usual routine business had been disposed of. The Chairman called upon Mr. Donald Campbell to read his communication of a case of *Enteritis*, which he interestingly described, and was followed by a lively discussion.

Dr. William McEachran then favored the meeting by reading an exhaustive paper on "Anthrax," a very fatal disease, and known also by different names, such as—splenis apoplexy, carbuncular fever, charbon, &c. The reader treated the subject very fully, and, after alluding to the fatality of the disease, and the danger of communicability by inoculation, to man, urged upon the members the necessity of using the greatest caution in handling animals who have died suddenly. and more particularly in performing autopsies. He illustrated this point by reading records of two cases of accidental inoculation occurring in this city, one of which proved fatal. After a vote of thanks to the essayists, the meeting closed. At the next meeting, December 9th, Mr. M. C. Baker, V.S., will read a paper, and Mr. B. D. Pierce will commmunicate a case.

STATISTICS OF CONTAGIOUS DISEASES OF ANIMALS IN THE DEPARTMENT OF THE SEINE, (FRANCE.)

By C. Leblanc.

HYDROPHOBIA.

In 1876, during the twelve months of the year, 301 cases were reported, amongst which 33 were presented to the Alfort school. They are classified as follows:

274 dogs, 32 sluts, 5 cats. 209 had raving, 102 dumb rabies; 45 persons were bitten.

In 1877, there were 378 cases—339 dogs, 39 sluts. 302 furious, 76 dumb rabies; 62 persons bitten.

In 1878, 613 cases are recorded, of which 441 were in Paris and 70 in the suburbs. Amongst these were 440 dogs, 68 sluts, 3 cats; 390 having raving, 121 dumb rabies; 103 human beings were bitten—67 adults, 36 children—24 deaths amongst these.

In 1879, there were only 285 cases, viz: 249 dogs, 34 sluts, 2 cats. 67 persons were bitten, 12 deaths following.

GLANDERS.

In 1876, there were 189 cases recorded, viz: 72 in Paris, 14 in the suburbs, and 103 in different horse establishments.

In 1877, 134 cases, divided into 72 from Paris, 14 from the surroundings, 147 from the horse companies.

In 1878, 206 cases are recorded in the companies, 28 in Paris, 7 in the surroundings; a total of 241.

In 1879, there were 279, viz: 174 from the horse companies, 75 from Paris, the remaining 30 from the suburbs.

PLEURO-PNEUMONIA.

In 1878, there were examined 267 cases, 43 in oxen, 224 in cows.

In 1879, 210 cases were found, 46 in oxen, 146 in cows.—*Archives Vétérinaires.*

IN MEMORIAM.

At a meeting of the Medical Association of the American Veterinary College, the deaths of E. R. Wing, D.V.S., and of A. D. Carman, D.V.S., were announced and a committee appointed to draft resolutions. This committtee subsequently reported and the Society adopted the following:

Whereas, It has pleased Almighty God to remove from us our associate and brother, Augustus D. Carman, who during his college course, won the esteem and respect of his associates, and since then has proven his ability and worth in the zealous pursuit of his profession. Therefore be it

Resolved, That we recognize the hand of Divine Providence, who saw fit to remove our brother after a severe and protracted illness.

Resolved, That we extend to his widow and sorrowing family our heartfelt sympathy in their bereavement.

Resolved, That a copy of these resolutions be sent to his family, that they be published in the Brooklyn *Eagle* and the AMERICAN VETERINARY REVIEW.

Signed, S. M. WALTON, D. J. DIXON, MADISON BUNKER, } Committee.

Whereas, God in his infinite wisdom has seen fit to remove from among us our friend and brother, Edgar R. Wing, who during his college course endeared himself to a large circle of acquaintances, and since then has won the respect and esteem of the members of his chosen profession, in the pursuit of which he met his untimely death. Therefore, be it

Resolved, That we the members of this Association recognize the hand of an allwise Father, in his sudden death; while at the same time we deeply and sincerely mourn his loss, and that one so zealous in his work should be cut off in the beginning of his usefulness.

Resolved, That we extend our heartfelt sympathy to his bereaved family in their sorrow, knowing however much we may feel the loss, theirs must be infinitely greater.

Resolved, That a copy of this memorial be sent to the family of the deceased, that it be published in the Needham papers and in the AMERICAN VETERINARY REVIEW.

S. M. WALTON,
D. J. DIXON,
MADISON BUNKER, } Committee.

EXCHANGES, ETC., RECEIVED.

FOREIGN EXCHANGES. — Veterinary Journal, Veterinarian, Recueil de Medecine Veterinaire, Archives Vétérinairès, Journal de Zootechnie, Revue d'Hygiene, Clinica Veterinaria, Revue fur Thierheilkunde und Thierzucht, Gazette Medicale, Annales de Belgique.

HOME EXCHANGES.—Turf, Field and Farm, American Scientific, Medical Record, National Live Stock Journal, Prairie Farmer, Country Gentleman, Surgical Reporter, Boston Cultivator, American Agriculturist.

PAMPHLET.—La Distomatose, by A. Zundel.

COMMUNICATIONS.—J. Penniman, N. Lanzillotti Buonsanti, Director of the Veterinary School of Milan.